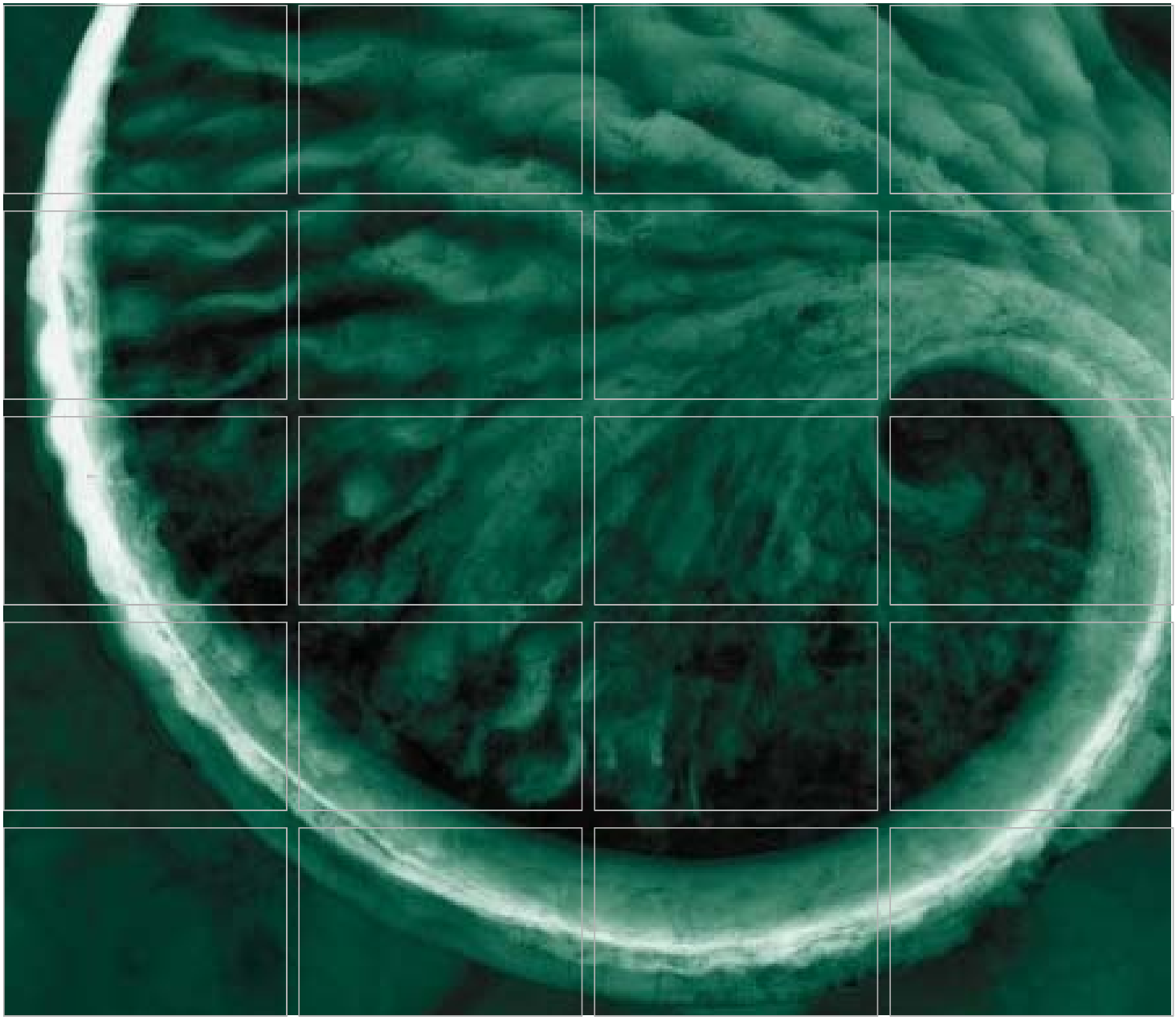

Groundwater Monitoring Report – March 2012

52nd Street Superfund Site Operable Unit 3
Phoenix, Arizona

November 2012

Prepared for:
Motorola 52nd Street
Superfund Site
Operable Unit 3
Working Group

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Superfund Site Operable Unit 3
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Project No. 96498

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LIST OF ACRONYMS AND ABBREVIATIONS

µg/L	microgram(s) per liter
1,1-DCE	1,1-Dichloroethene
ADEQ	Arizona Department of Environmental Quality
AOC	Administrative Order on Consent
AWQS	Aquifer Water Quality Standard
cis-1,2-DCE	cis-1,2-dichloroethene
CRA	Conestoga-Rovers & Associates
D	Deep
ERM	Environmental Resources Management
FS	Feasibility Study
LCSD	Laboratory control sample duplicate
L-SRG	Lower Salt River Gravels Sub-unit
M	First Intermediate
M2	Second Intermediate
MS	Matrix spike
MSD	Matrix spike duplicate
OU	Operable Unit
PARCC	Precision, accuracy, representativeness, comparability, and completeness
PCE	Tetrachloroethene
PE	Performance evaluation
QAPP	Quality Assurance Project Plan
QC	Quality control
RI	Remedial Investigation
RPD	Relative percent difference
S	Shallow
SOW	Statement of Work
TCE	Trichloroethene
US EPA	United States Environmental Protection Agency
U-SRG	Upper Salt River Gravels Sub-unit
VOC	Volatile organic compound

1.0 INTRODUCTION

This groundwater monitoring report presents the results of the March 2012 semiannual groundwater monitoring event at the Motorola 52nd Street Superfund Site, Operable Unit (OU) 3, in Phoenix, Arizona (Site).

1.1 MOTOROLA 52ND STREET SUPERFUND SITE HISTORY

The Motorola 52nd Street Superfund Site covers approximately 7,800 acres and consists of three adjoining groundwater OUs described as follows:

- OU1 is the easternmost OU and contains the former Motorola 52nd Street semiconductor plant. The boundaries of OU1 are 52nd Street to the east, Palm Lane to the north, Roosevelt Street to the south, and 44th Street to the west.
- OU2 lies west of OU1 and contains the OU2 Groundwater Extraction System and several OU2 potentially responsible party facilities, including the Honeywell International, Inc. (Honeywell) 34th Street facility. The approximate boundaries of OU2 are Roosevelt Street to the north, 44th Street to the east, Buckeye Road to the south, and 20th Street to the west. The OU2 Groundwater Extraction System is located along 20th Street.
- OU3 lies west of OU2. The boundaries of OU3 are McDowell Road to the north, 20th Street to the east, Buckeye Road to the south, and 7th Avenue to the west.

Figure 1 provides a location map of the OUs at the Site. The Arizona Department of Environmental Quality (ADEQ) is the lead regulatory agency for OU1 and OU2, and the United States Environmental Protection Agency (US EPA) is the lead regulatory agency for OU3.

On 4 October 1989, the US EPA placed the Motorola 52nd Street Superfund Site on the National Priorities List. Motorola (now Freescale Semiconductor, Inc. [Freescale]) investigated their facility and, in 1992, fully implemented the OU1 groundwater extraction and treatment plant under ADEQ oversight. In 1991, investigation activities in OU2, under ADEQ oversight, resulted in the selection of an interim remedy utilizing a groundwater extraction and treatment system to contain a groundwater plume of chlorinated solvents (at approximately 20th Street). Freescale and Honeywell International, Inc. (Honeywell) (the Companies) constructed and initially operated the OU2 treatment system under US EPA oversight. The Companies negotiated an Administrative Order on Consent (AOC)

with ADEQ to continue to operate and maintain the system under ADEQ oversight.

In 1983, a groundwater sample collected from the Eastlake Park irrigation well located in OU3 near 16th Street and Jefferson Street contained chlorinated volatile organic compounds (VOCs). The OU2 Remedial Investigation (RI) Report, completed by Motorola in 1992, indicated that the chemicals migrating from the Motorola facility extended into the East Washington Project Area, which prompted ADEQ and the US EPA to create the OU3 Study Area (now referred to as OU3) to address potential co-mingled VOC groundwater impacts between 20th Street and 7th Avenue.

1.2 OU3 HYDROGEOLOGY

OU3 groundwater is found primarily within the unconsolidated regional Upper Alluvial Aquifer. Groundwater within the alluvial aquifer flows toward the west and southwest (Shaw Environmental, Inc. [Shaw] 2009). Four hydrostratigraphic zones—Shallow (S), First Intermediate (M), Second Intermediate (M2), and Deep (D)—were originally designated in OU3 (US EPA 2009). Following agreement with ADEQ and the US EPA during a technical working group meeting in January 2011, the hydrostratigraphic nomenclature for OU3 was revised to be more consistent with OU1 and OU2 and the overall Motorola 52nd Street Superfund Site. The S, M, and M2 Zones correlate to the Salt River Gravels Sub-unit—further divided into Upper and Lower Salt River Gravels Sub-units (U-SRG and L-SRG, respectively)—and the D Zone correlates to the Basin Fill Sub-unit. Per a request from the US EPA, potentiometric surface and the trichloroethene (TCE) isoconcentration contour maps were developed for the U-SRG, L-SRG, and the Basin Fill Sub-units. Lithologic descriptions of these zones are provided in Table 1.

Table 1 OU3 Hydrostratigraphic Zones

Aquifer Unit	Original Hydrostratigraphic Zone	Revised Hydrostratigraphic Zone	Description
Upper Alluvial Aquifer	Shallow Zone (S)	Upper Salt River Gravels Sub-unit	Coarse-grained Salt River Gravels, including minor amounts of interbedded and laterally discontinuous fine-grained deposits.
	First Intermediate Zone (M)	Lower Salt River Gravels Sub-unit	Coarse-grained deposits dominated by gravel similar to Salt River Gravels. Base of zone commonly includes a fine-grained layer.
	Second Intermediate Zone (M2)	Lower Salt River Gravels Sub-unit	Coarse-grained deposits dominated by gravel similar to Salt River Gravels.

Aquifer Unit	Original Hydrostratigraphic Zone	Revised Hydrostratigraphic Zone	Description
Middle Alluvial Aquifer	Deep Zone (D)	Basin Fill Sub-unit	Basin Fill deposits consisting of an upper fine-grained layer with an underlying interval of interbedded fines and sand.

1.3 PREVIOUS SITE INVESTIGATIONS

Three phases of groundwater investigation have been conducted in the area now known as OU3. Phases I and II were conducted by the US EPA pursuant to the Arizona Water Quality Assurance Revolving Fund program. The scopes of work for the Phase I and II field programs were presented in the following documents:

- *Final Groundwater Investigation Work Plan* (IT Corporation [IT] 2001).
- *Work Plan Supplement to the Final Groundwater Investigation Work Plan for Proposed Phase II Wells* (IT 2003).

Phase I included the construction of 15 groundwater monitoring wells between February and March 2002, and Phase II included construction of 13 groundwater monitoring wells between May and July 2003. Phase II also included the abandonment and replacement of three Phase I wells (OU3-5S, OU3-5M, and OU3-5D).

The OU3 Working Group—comprised of Honeywell and Arizona Public Service Company, a subsidiary of Pinnacle West—entered into an AOC with the US EPA on 23 September 2009 (US EPA 2009). The Statement of Work (SOW) for the OU3 Working Group was included as Appendix A of the AOC. Beginning in March 2010, the OU3 Working Group assumed responsibility for the OU3 groundwater monitoring program, in accordance with the AOC and SOW. The OU3 monitoring program consists of semiannual sampling events performed in conjunction with the Phase III OU3 RI and Feasibility Study (FS) (OU3 Working Group 2009).

The scope of the Phase III RI/FS field program was presented in the *Final OU3 Phase III Groundwater RI/FS Work Plan (*Work Plan*)* approved by the US EPA on 15 July 2010 (Environmental Resources Management [ERM] 2010). Phase III was initiated by the OU3 Working Group in 2010. Seven groundwater monitoring wells (OU3-16S, OU3-10S, OU3-17S, OU3-20S, OU3-16M, OU3-19M, and OU3-20M) were installed within the Salt River Gravels Sub-unit. Wells OU3-16S, OU3-10S, OU3-17S, and OU3-20S were installed in the U-SRG to provide data on the eastern, western, and southern extent of the plume. Wells OU3-16M, OU3-19M,

and OU3-20M were installed in the L-SRG to provide data on the southern and western edges of the plume and to better define the central and eastern core of the plume. Further information regarding the installation of these wells is included in the *Final Groundwater Monitoring Well Installation Report*, submitted in June 2011 (ERM 2011a).

In accordance with the SOW, four quarters of Phase III well sampling were conducted separately from OU3 semiannual monitoring of the Phase I and II wells. Monitoring results for the new wells were reported separately through submission of data reports and were not presented in the semiannual groundwater monitoring reports. However, analysis of the combined data sets will be conducted as part of the overall RI. In September 2011, the four quarters of monitoring for the new wells were completed, and these wells were incorporated into the OU3 semiannual monitoring program in March 2012.

Figure 2 provides locations for all wells included in the OU3 groundwater monitoring program. Table 2 provides the construction details for OU3 monitoring wells.

1.4 PURPOSE AND SCOPE

The purpose of this groundwater monitoring program is to evaluate VOC trends within OU3 groundwater. The groundwater monitoring program provides data to support the OU3 RI/FS. The OU3 groundwater monitoring program is coordinated with other investigations in the region and includes the following activities:

- Semiannual measurement of groundwater levels in wells included in the OU3 groundwater monitoring program;
- Semiannual collection of groundwater samples for laboratory analysis; and
- Evaluation of hydraulic and water quality data for OU3 groundwater.

Groundwater monitoring activities performed during the March 2012 event were conducted according to the methodology and procedures in the Work Plan and the *Technical Memorandum No.1 – Proposed changes to Appendix A- Statement of Work for OU3 Remedial Investigation/Feasibility Study Motorola 52nd Street Superfund Site, Operable Unit 3; Proposed Groundwater Monitoring Well OU3-17S and Updated Schedule* (ERM 2011b).

1.5 REPORT ORGANIZATION

Section 1.0 identifies the site background information and the purpose and scope of the groundwater monitoring program. Section 2.0 describes the groundwater monitoring program and the field and analytical methods incorporated into the program. Section 3.0 describes the March 2012 groundwater monitoring results. Section 4.0 contains the references cited within this report.

2.0 GROUNDWATER MONITORING ACTIVITIES

The March 2012 semiannual groundwater monitoring event was conducted between 12 and 30 March 2012, with additional activities conducted on 10 April 2012. Table 2 (attached) provides a list of wells sampled during this event, as well as construction details for each well sampled.

The following sections briefly describe the procedures followed and protocols used by ERM during this groundwater monitoring event. The groundwater monitoring event followed the requirements set forth in the Work Plan to ensure that the data collected were of consistent quality. This semiannual monitoring event included the following activities:

- Groundwater level measurements;
- Groundwater purging and sampling;
- Sample analysis;
- Decontamination; and
- Investigation-derived waste management.

A summary of the methodology used to conduct each of these activities is provided in the following subsections. A more detailed description of the procedures and methodology used during this sampling event is provided in the Field Sampling Plan and Quality Assurance Project Plan (QAPP), included as Appendices A and B of the Work Plan (ERM 2010), respectively.

2.1 GROUNDWATER LEVEL MEASUREMENTS

Prior to groundwater sampling, static groundwater levels and well depths were measured in each monitoring well included in the OU3 groundwater monitoring program. On 11 and 12 March 2012, all water levels were measured to the nearest 0.01-foot utilizing an electric water level indicator capable of producing measurements accurate to within ± 0.01 foot. On 11 March 2012, water levels were collected from Westbay® monitoring well EW-13 using specialized Westbay® gauging and sampling equipment.

Groundwater elevation contour maps for the U-SRG, L-SRG, and Basin Fill Sub-unit (presented as Figures 3, 4, and 5, respectively) were generated using the measurements collected on 11 and 12 March 2012.

2.2 *GROUNDWATER PURGING AND SAMPLE COLLECTION*

The groundwater monitoring wells were purged using an electric submersible pump or a disposable bailer. At the start of purging, and at intervals during purging, field parameters—including pH, temperature, conductivity, dissolved oxygen, and oxidation-reduction potential—were measured. The field parameters were measured between 12 and 30 March 2012 and on 10 April 2012 using a Horiba U-52 multi-meter attached to a flow-through cell. Field parameters and qualitative observations—including odor, clarity, and/or color—were recorded on groundwater sampling field data collection forms provided in Appendix A.

Purging was considered complete after a minimum of 3 saturated well volumes were removed and after the following field parameters had stabilized for 3 consecutive readings:

- pH within ± 0.1 unit;
- Temperature within ± 1.0 degree; and
- Conductivity within 10 percent.

After the purge was completed, the groundwater samples were collected from the pump outlets or with a disposable bailer. A sample label containing a unique identification number was attached to each sample container and the sample was recorded on a chain-of-custody form. Samples analyzed for VOCs were collected in 40-milliliter vials pre-preserved with hydrochloric acid. Samples analyzed for 1,4-dioxane were collected in 1-liter amber glass bottles. All sample containers were provided by TestAmerica, Inc., an Arizona-certified laboratory (Arizona Department of Health Services [ADHS] # AZ0728). Samples were immediately placed in a cooler containing ice. A trip blank prepared by the laboratory was also placed in the cooler.

ERM field personnel were responsible for ensuring the proper preservation, packaging, labeling, documentation, storage, handling, and transportation of groundwater samples collected during the March 2012 sampling event. Groundwater samples were hand-delivered daily to TestAmerica, Inc.'s Phoenix, Arizona facility, under standard chain-of-custody procedures. All samples were received by TestAmerica, Inc., in accordance with the requirements of Section 3.3.3 of the QAPP (ERM 2010).

2.3 *SAMPLE ANALYSIS*

All groundwater samples collected during the March 2012 event were analyzed by TestAmerica, Inc., using the following methods:

- VOCs by US EPA Test Method 8260B; and
- 1,4-Dioxane by US EPA Test Method 8270C.

The complete analytical results for the March 2012 sampling event are provided in Appendix B.

2.4 *DECONTAMINATION*

Purging and sampling equipment were decontaminated before use at each groundwater monitoring well in accordance with Appendix A, Section 5.11.3 of the Work Plan (ERM 2010). Submersible pumps were utilized for purging and sample collection, except as described in Section 2.6.

Submersible pumps and galvanized steel drop-pipe or flexible tubing were decontaminated using the following procedures:

- The exterior of the pump or other non-dedicated equipment was placed on a piece of Visqueen film and then washed with a power washer. The Visqueen was folded so that it had edges to contain the decontamination water. The water contained within the folded Visqueen was then poured into the portable holding tank for later discharge to the City of Phoenix sanitary sewer.
- The exterior of the pump was washed with Alconox solution. Alconox solution was also sprayed into the pump until extruded from the intake port. Any piping or tubing used, such as a reel pump, had Alconox solution sprayed on both the exterior and interior of the piping/tubing.
- The equipment exterior was then washed with a power washer. Piping was washed both inside and out by circulating water though the tubing, via the discharge manifold, so that at least 5 gallons of tap water flowed through the tubing and were extruded from the pump.
- The submersible pump was then submerged in a container filled with distilled water and operated until approximately 5 gallons had been circulated through and extruded from the pump.

Field monitoring instrumentation and water level meters were decontaminated before use at each well. Each was decontaminated by spraying the surfaces with Alconox solution, rinsing with distilled water, and air-drying.

2.5 *INVESTIGATION-DERIVED WASTE MANAGEMENT*

Purge and decontamination water was contained in a portable tank and the water was discharged directly to the sanitary sewer under the permits issued by the City of Phoenix on 7 March 2012 and 4 April 2012 (Appendix C). Miscellaneous waste—such as used personal protective equipment, disposable sampling equipment, polyethylene sheeting, and general trash—was disposed of as municipal solid waste.

2.6 *DEVIATIONS FROM THE WORK PLAN*

Deviations from the procedures in the Work Plan included the following:

- OU3-2M and OU3-20S were resampled on 10 April 2012 due to an insufficient amount of sample submitted for matrix spike (MS)/matrix spike duplicate (MSD) analysis at the laboratory; and
- EW-19S was purged and sampled with a 2-inch stainless steel bailer rather than a submersible pump due to rust and grime build-up on the interior well casing. This well will be inspected using downhole camera equipment during the September 2012 groundwater monitoring event.

All other procedures in the Work Plan were followed during the March 2012 groundwater monitoring event.

3.0 MARCH 2012 GROUNDWATER MONITORING RESULTS

During the March 2012 semiannual groundwater monitoring event, groundwater levels were measured in 48 monitoring wells and groundwater samples were collected from 43 monitoring wells and the 4 ports of Westbay® multi-port well EW-13. Monitoring well IN-MW-1 was gauged, but not sampled due to insufficient water in the well. Monitoring well EW-22S was also gauged and sampled during the March 2012 event; it is also sampled annually in September as part of the OU2 groundwater monitoring program. The data from EW-22S was used to close the ½-mile spatial data gap that exists between groundwater monitoring wells EW-20 and NW-4S within the U-SRG (see Figures 3 and 6). Of the monitoring wells and ports that were sampled, 17 were screened in the U-SRG, 19 were screened in the L-SRG, and 11 were screened in the Basin Fill Sub-unit.

This OU3 March 2012 semiannual groundwater monitoring report also contains non-OU3 groundwater analytical data (Table 7) transmitted to ERM by Conestoga-Rovers & Associates (CRA) (CRA 2012) and CH2M HILL (CH2M HILL 2012).

3.1 GROUNDWATER LEVEL MEASUREMENT SUMMARY

Groundwater elevations measured in the OU3 monitoring wells during this monitoring event are provided in Table 3 (attached). Figures 3, 4, and 5 present the March 2012 groundwater elevation contours for the U-SRG, L-SRG, and the Basin Fill Sub-unit wells, respectively. Groundwater elevation data from the wells that were not sampled as part of the OU3 monitoring program (i.e., non-OU3 program wells) were used in the interpretations presented in these figures.

Groundwater elevation data for wells OU3-13D and EW-22D were not used for the Basin Fill Sub-unit potentiometric map. Data from well OU3-13D have historically been anomalous (Shaw 2010) and therefore difficult to integrate into the site-wide potentiometric interpretation. The water level measurement from well EW-22D was not used because it is screened from 407 to 427 feet below ground surface, which is over 120 feet below the other OU3 Basin Fill Sub-unit monitoring wells (Shaw 2010). This area is also hydrologically complex due to the OU2 groundwater extraction system and nearby bedrock ridge.

The groundwater elevations increased relative to September 2011 data in 37 of 48 OU3 groundwater monitoring wells gauged during the March 2012 monitoring event, with an average increase of 1.46 feet.

The water level decreased relative to September 2011 data in 11 of 48 OU3 groundwater monitoring wells gauged during the March 2012 monitoring, with an average decrease of 0.31 feet. Overall, groundwater elevations were 1.32 feet higher in March 2012 than in September 2011.

Table 4 provides groundwater levels by hydrostratigraphic zone. Table D-1 in Appendix D contains a tabulation of historical water levels in the OU3 groundwater monitoring wells.

Table 4 Groundwater Level Summary

Hydrostratigraphic Zone	Range of Depth-to-Groundwater (ft bgs, min/max)	Range of Groundwater Elevations (ft amsl, min/max)	Maximum Groundwater Change* (ft)
Upper Salt River Gravels Sub-unit	82.97 (BE-MW-8)/ 94.88 (EWOU3-10S-R)	986.74 (EWOU3-10S-R) / 1,011.52 (OU3-20S)	4.19 (OU3-10S)
Lower Salt River Gravels Sub-unit	85.45 (OU3-11M2)/ 94.77 (OU3-10M)	987.48 (OU3-10M) / 1,011.31 (OU3-20M)	4.27 (OU3-10M2)
Basin Fill Sub-unit	77.90 (EW-19D)/ 87.73 (OU3-13D)	992.91 (OU3-8D) / 1,016.64 (OU3-14D)	3.71 (OU3-8D)

Notes: ft = feet; bgs = below ground surface; amsl = above mean sea level; min = minimum; max = maximum;
* = Since previous semiannual groundwater monitoring event.

The estimated groundwater gradients west of 16th Street are presented in Table 5, along with the wells used to determine the gradient. These gradients were based on groundwater elevations from this gauging event and calculated using the 3-point method. It should be noted that the groundwater gradients were not calculated for the area east of 16th Street due to the depression of the potentiometric surface caused by the influence of the localized bedrock high and the operation of the OU2 groundwater extraction system. The OU2 groundwater extraction system was offline, between January 2012 and March 2012, for annual system maintenance, which contributed to the inconsistent groundwater elevation changes in monitoring wells NW-4D, NW-6D and NW-7D on Figure 5.

Table 5 Estimated Groundwater Gradients

Hydrostratigraphic Zone	Gradient	Wells Used To Calculate Gradient
Upper Salt River Gravels Sub-unit	0.0019 ft/ft west-southwest	OU3-10S, OU3-4S, and SC-MW-1D

Hydrostratigraphic Zone	Gradient	Wells Used To Calculate Gradient
Lower Salt River Gravels Sub-unit	0.0019 ft/ft west -southwest	OU3-10M, OU3-14M, and OU3-12M
Basin Fill Sub-unit	0.0025 ft/ft west-southwest	OU3-8D, OU3-6D, and OU3-14D

Notes: ft = feet

3.2 *ANALYTICAL RESULTS SUMMARY*

A total of 52 samples were collected from 47 wells during the March 2012 groundwater monitoring event. A summary of analytes detected is provided in Table 6. Figures 6, 7, and 8 present TCE data for the U-SRG, L-SRG, and Basin Fill Sub-unit wells, respectively. TCE concentration data from several wells sampled as part of the OU2 monitoring program were also used in these figures. The TCE data from select non-OU3 program wells were used to illustrate TCE distribution along the OU2/OU3 boundary. The non-OU3 program wells that were used to develop Figures 3 through 8 are listed in Table 7.

The following analytes were detected above their respective Arizona Aquifer Water Quality Standards (AWQS) during the March 2012 groundwater monitoring event:

- TCE was detected above the AWQS of 5 micrograms per liter (µg/L) in samples from 18 wells (EWOU3-10S-R, EW-19S, EW-20, EW-22S, OU3-2M, OU3-5M2, OU3-5MR, OU3-5SR, OU3-8S, OU3-8M2, OU3-10M, OU3-10M2, OU3-10S, OU3-13M, OU3-16S, OU3-16M, O3-17S, and OU3-19M). Concentrations ranged from 6.4 (OU3-10S) to 100 µg/L (OU3-16M). During the September 2011 monitoring event, 13 wells exceeded the AWQS (ERM 2012). The average exceedance was approximately 3.1 µg/L higher in March 2012 than in September 2011.
- Tetrachloroethene (PCE) was detected above the AWQS of 5 µg/L in 1 well (BE-MW-8), at a concentration of 6.2 µg/L. During the September 2011 monitoring event, the PCE concentration in well BE-MW-8 was 5.2 µg/L (ERM 2012).
- 1,1-Dichloroethene (1,1-DCE) was detected above the AWQS of 7 µg/L in samples from 4 wells (OU3-5M2, OU3-10M2, OU3-16M, and OU3-19M), at concentrations ranging from 7.5 (OU3-19M) to 12 µg/L (OU3-16M). During the September 2011 monitoring event, 1,1-DCE concentrations in wells OU3-5M2 and OU3-10M2 exceeded the AWQS, at concentrations of 7.9 and 9.4 µg/L, respectively (ERM 2012).

- None of the OU3 wells exceeded the AWQS of 70 µg/L for cis-1-2-dichloroethene (cis-1,2-DCE).

The compound 1,4-dioxane was detected in 14 of the 48 wells sampled during the March 2012 groundwater monitoring event. The majority of the 1,4-dioxane results were near or below the laboratory's practical quantitation limit of 1.0 µg/L, and no 1,4-dioxane concentration exceeded 3.5 µg/L. The highest concentration, 3.3 µg/L, was measured in well OU3-10M2. Regulatory standards have not been promulgated for 1,4-dioxane, although the US EPA has listed the compound as a probable human carcinogen and has a Drinking Water Advisory Level of 3.0 µg/L. ADEQ has not promulgated a 1,4-dioxane groundwater standard.

Appendix E provides time-concentration graphs for TCE, PCE, 1,1-DCE, and cis-1,2-DCE versus groundwater elevation for all OU3 program monitoring wells. The available historical data from the non-OU3 (Shaw 2010; CRA 2012) and OU3 (Shaw 2010) program wells were used to construct the graphs.

The time-concentration graphs indicate that concentrations of TCE, PCE, 1,1-DCE, and cis-1,2-DCE have decreased site-wide since the OU3 groundwater monitoring program began in June 2002. Over this timeframe, 16 monitoring wells have shown decreases in TCE of one order of magnitude or more. These wells include EW-19S, EWOU3-10S-R, EW-20, EW-21, EW-22S, OU3-1M, OU3-2M, OU3-6M, OU3-10M, OU3-10M2, OU3-12M, OU3-12D, OU3-13M, OU3-13D, OU3-14M, and OU3-14D. Wells EWOU3-10S-R, OU3-10M, and OU3-10M2 are located near the southern boundary of the plume, near Washington Street and 1st Street. The other wells are located within the southern, central, and northern portions of the plume, between 5th Street and 16th Street (see Figures 6, 7, and 8).

3.3 QUALITY ASSURANCE/QUALITY CONTROL RESULTS SUMMARY

Field quality control (QC) samples were collected or prepared to evaluate if sampling practices affected analytical results. Field QC samples included field duplicates, trip blanks, and equipment rinsate samples. All samples received by TestAmerica, Inc. were between 0 and 5 degrees Celsius.

This report contains data that were not collected as part of the OU3 groundwater monitoring program and, therefore, were not included in the OU3 data validation process. Data not collected or validated as part of the OU3 monitoring program were obtained from CRA (CRA 2012).

The project data from the March 2012 OU3 semiannual groundwater monitoring event were validated in accordance with Section 4.1 of the QAPP for compliance with project quality assurance/QC requirements, and included an evaluation of field and laboratory QC sample analyses. Samples were analyzed for VOCs and 1,4-dioxane in accordance with the Work Plan.

3.3.1 Field Quality Control

The field QC samples associated with the March 2012 groundwater monitoring event included field duplicate samples, equipment rinsate blanks, field blanks, MS/MSDs, trip blanks, and a performance evaluation (PE) sample. Field duplicate samples were used to evaluate overall field sample precision and were collected at a frequency of 1 duplicate for every 20 samples, for a total of 4 duplicate samples. Field duplicate samples were evaluated by calculating the control limit between the sample and its duplicate.

Acceptable precision control limit criteria were established at a maximum relative percent difference (RPD) of ± 20 percent. Of the 4 field duplicate pairs collected, all had RPDs of ≤ 10 percent for all analytes. Thus, the overall analytical and sampling precision for this event was considered acceptable.

Ten equipment rinsate blanks and 10 trip blanks were collected during the groundwater monitoring event. These were analyzed for VOCs by US EPA Method 8260B. No trip blanks were found to contain detectable analytes. No analytes were detected in the 8 equipment rinsate blanks other than trihalomethanes (chloroform, bromodichloromethane, and dibromochloromethane), typically found in disinfected water such as that used to make the equipment blank, indicating good data quality sufficient to meet data quality objectives.

Per the Work Plan, 1 PE sample was collected during the March 2012 groundwater monitoring event. This was coordinated with the US EPA to provide an external review of laboratory performance. The PE sample was obtained from the US EPA Quality Assurance Technical Support Laboratory, operated for the US EPA by Shaw. The PE sample contained certified concentrations of the target compounds that were anticipated to be identified at OU3. The PE sample was submitted to the laboratory double-blind; the sample was introduced as part of the daily sampling event in the field and was analyzed by the laboratory with a field-specific identity number of GW-Z1-1-032212. This process conformed to the requirements of the Work Plan.

3.3.2 *Laboratory Quality Control*

Data were evaluated in terms of precision, accuracy, representativeness, comparability, and completeness (PARCC) parameters. The PARCC parameters were evaluated for the March 2012 groundwater data set as follows:

Precision: Precision was expressed as RPD between the results of replicate sample analyses: sample duplicates, laboratory control sample duplicates (LCSD), and the MSD. When analyte RPDs exceeded acceptance criteria, results were flagged, as appropriate.

For the March 2012 groundwater monitoring event, most LCSD and MSD results were reported within project control limits. If the LCSD or MSD sample results were reported outside of the project control limits, due to high or low surrogate recoveries, the data were flagged with either UJ or J. UJ indicates that the analyte was analyzed for but not detected; thus, the sample detection limit is an estimated value. J indicates that the reported result is an estimated value.

Accuracy: Accuracy was demonstrated by recovery of target analytes from spiked blank and sample matrices, laboratory control samples, and MS samples. For organic methods, accuracy was also demonstrated through recovery of surrogates from each field and QC sample. The recovery of target analytes from spiked samples was compared to prescriptive acceptance criteria. When these criteria were not met, the data were flagged, as appropriate.

For the March 2012 groundwater monitoring event, most of the laboratory control sample and MS sample results were reported within project control limits. The surrogate recoveries that were only marginally outside project control limits were flagged, but did not impact data usability.

Representativeness: Representativeness of the samples submitted for analysis was ensured by adhering to the standard sampling techniques documented in the Work Plan.

Comparability: Comparability of sample results was ensured using the approved sampling and analysis methods specified in the Work Plan.

Completeness: One of the samples, IN-MW-1, could not be collected because of a dry well, resulting in 98 percent field completeness for the sampling event. Based on results of data validation for the samples submitted for laboratory analysis, analytical completeness was

approximately 99 percent. Analytical completeness was less than 100 percent due to qualification (i.e., addition of U and/or J flags) of some of the analytes for a small number of the samples. None of the flagged results were considered unusable; therefore, technical completeness was 100 percent.

In conclusion, the analytical results generally met the PARCC objectives. No data for the environmental samples were rejected and any data quality issues, as discussed above, were identified. Therefore, the results associated with the sampling event were of good quality and useable for the intended purpose.

3.4 DATA VALIDATION

A Tier 1 data validation was done on all laboratory data collected during the OU3 March 2012 groundwater monitoring event, and a Tier 3 data validation was done on 10 percent of the data, in accordance with the QAPP. Data validation was performed to evaluate the overall data quality and identify any non-conformances in field or laboratory activities. No samples collected during this monitoring event were flagged for 1,1-DCE, TCE, PCE, 1,1-DCA, and cis-1,2-DCE analyses. All laboratory and validation data qualifiers are summarized in Table 6. The validation determined that all project requirements and completeness were met, and all data collected during the March 2012 groundwater monitoring event are usable for decision-making purposes. A complete data validation report for the OU3 March 2012 groundwater monitoring event is provided as Appendix F.

4.0 REFERENCES

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Figures

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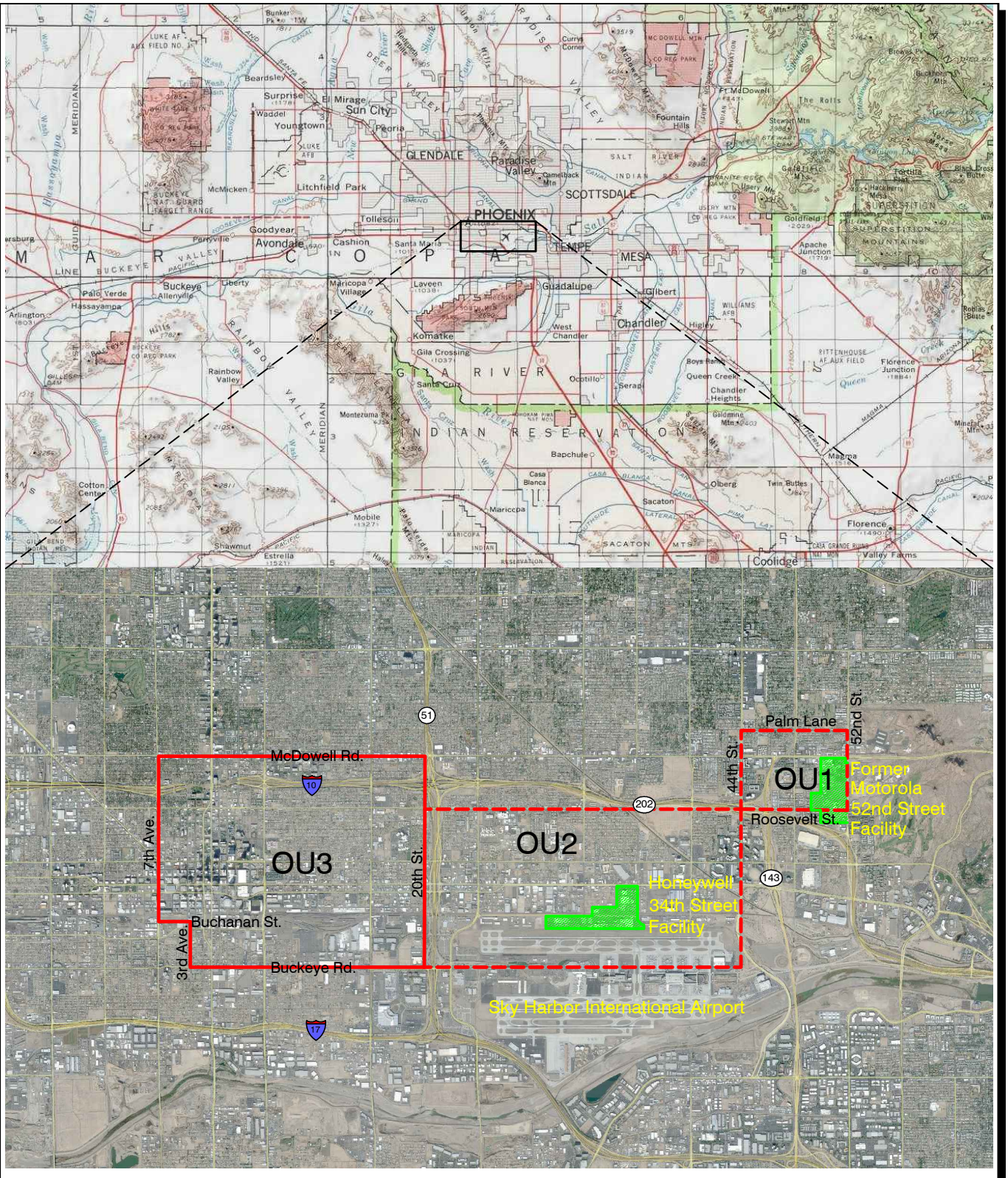

LEGEND

OU3 Boundary

OU1 and OU2 Boundary

References:
TOPO!® Software
U.S.G.S. 500k Map Series; Phoenix, Arizona
Aerial Photo Source: © 2009 Google
Earth Pro Ver 5.0.11733.9347

Figure 1
Site Location Map
Operable Unit 3
Motorola 52nd Street Superfund Site
Phoenix, Arizona

ERM 02/12

Project No. 0096498.029
Date: 02/14/12
Drawn By: R. Olson
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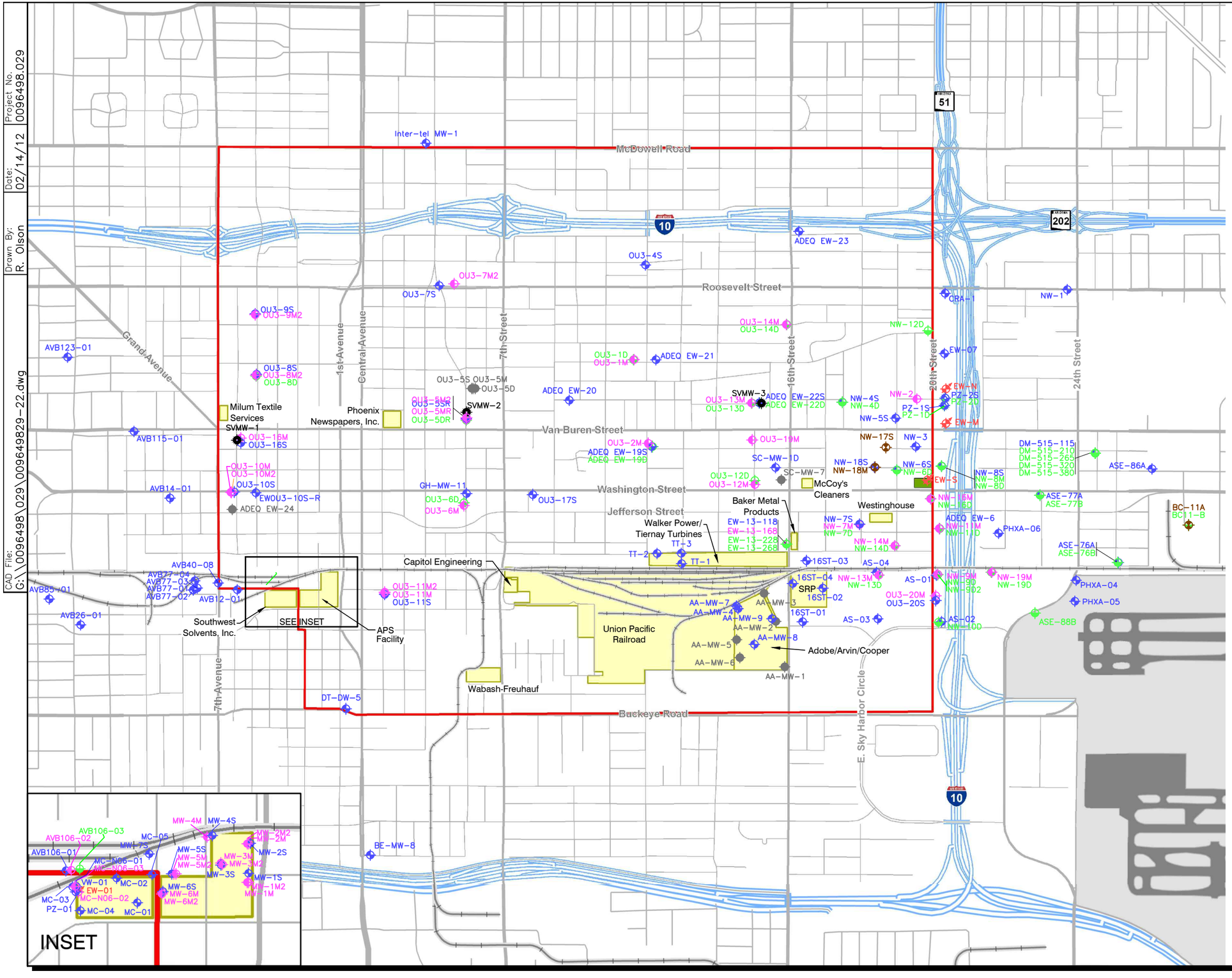

LEGEND

- Soil Vapor Monitoring Well
- OU2 Groundwater Extraction Well
- Abandoned Well

Salt River Gravels Sub-unit

- Upper Salt River Gravels (U-SRG) Groundwater Well
- Upper Salt River Gravels (U-SRG) Piezometer
- Lower Salt River Gravels (L-SRG) Groundwater Well

Basin Fill Sub-unit

- Groundwater Well
- Colluvium Zone Groundwater Well

- OU3 Boundary
- OU2 Groundwater Treatment Facility
- PRP Location

N

0 1600

Approx. Scale (feet)

Figure 2
Well Locations
Operable Unit 3
Motorola 52nd Street Superfund Site
Phoenix, Arizona

ERM 02/12

Project No. 0096498.033
Date: 09/25/12
Drawn By: R. Olson
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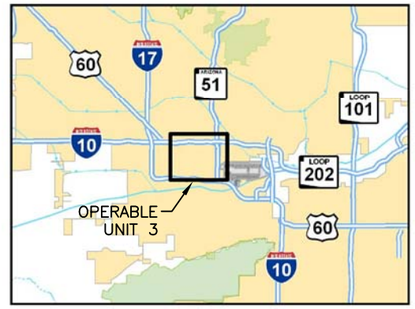


LEGEND

Salt River Gravels Sub-unit

- Upper Salt River Gravels (U-SRG) Groundwater Well
- Upper Salt River Gravels (U-SRG) Piezometer
- OU2 Groundwater Extraction Well
- Well Not Monitored by the OU3 Working Group
- 996 Groundwater Elevation Contour (ft amsl); Dashed Where Inferred; Contour Interval = 2 feet
- 996.83 Groundwater Elevation (ft amsl) in OU3 Monitoring Well, March 2012
- 1011.02* Groundwater Elevation (ft amsl) in CRA Monitoring Well, March 2012
- ** Not Used for Contouring
- NM Not Measured
- ft amsl Feet Above Mean Sea Level

- OU3 Boundary
- OU2 Groundwater Treatment Facility
- PRP Location

N

0 1600
Approx. Scale (feet)

Figure 3
Upper Salt River Gravels Sub-unit
Groundwater Contour Map - March 2012
Operable Unit 3
Motorola 52nd Street Superfund Site
Phoenix, Arizona

ERM 09/12

Project No. 0096498.033
Date: 06/26/12
Drawn By: R. Olson
CAD File: G:\0096498\033\0096498033-05.dwg

McDowell Road
Roosevelt Street
Van Buren Street
Washington Street
Jefferson Street
Buckeye Road

1st Avenue
Central Avenue
7th Street
16th Street
20th Street
7th Avenue

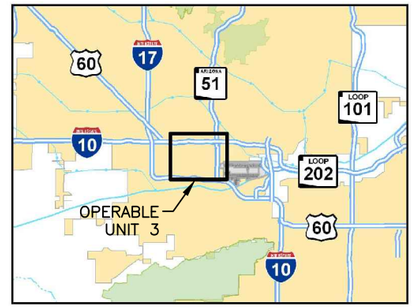
992 994 996 998 1000 1002 1004 1006 1008 1010 1012

OU3-7M2 998.04
OU3-9M2 990.62
OU3-8M2 989.99
OU3-5M2 996.72
OU3-5MR 996.74
OU3-16M 987.99
OU3-10M 987.48
OU3-10M2 987.67
OU3-6M 995.88
OU3-14M 1007.22
OU3-1M 1002.16
OU3-13M 1005.27
OU3-19M 1005.35
OU3-2M 1008.79**
OU3-12M 1005.27
OU3-11M2 992.60
OU3-11M 992.60
OU3-20M 1011.31

EW-N 995.66*
EW-M 996.2*
EW-S 1009.74*
NW-2 1008.23*
NW-17S 1008.46*
NW-18M 1008.35*
NW-16M 1010.35*
NW-7M 1008.38*
NW-11M 1010.94*
NW-14M 1009.83*
NW-15S 1013.26*
NW-9M 1010.81*
NW-19M 1013.49*
NW-13M 1009.63*
EW-S-168 1007.20

MW-3M2
MW-2M2
MW-1M2
MW-5M2
MW-6M2
MC-NO6-03

Milum Textile Services
Phoenix Newspapers, Inc.
McCoy's Cleaners
Baker Metal Products
Westinghouse
Walker Power/ Tiernay Turbines
Capitol Engineering
SRP
Union Pacific Railroad
Adobe/Arvin/Cooper
Wabash-Freuhauf
Southwest Solvents, Inc.
APS Facility



LEGEND

Lower Salt River Gravels Sub-unit

- Lower Salt River Gravels (L-SRG) Groundwater Well
- Colluvium Zone Monitoring Well
- OU2 Groundwater Extraction Well, Not Used for Contouring
- Well Not Monitored by the OU3 Working Group
- 996 Groundwater Elevation Contour (ft amsl); Dashed Where Inferred; Contour Interval = 2 feet
- 996.74 Groundwater Elevation (ft amsl) in OU3 Monitoring Well, March 2012
- 1010.81* Groundwater Elevation (ft amsl) in CRA Monitoring Well, March 2012
- NM Not Measured
- ** Not Used for Contouring
- ft amsl Feet Above Mean Sea Level

- OU3 Boundary
- OU2 Groundwater Treatment Facility
- PRP Location

N

0 1600
Approx. Scale (feet)

Figure 4
Lower Salt River Gravels Sub-unit
Groundwater Contour Map - March 2012
Operable Unit 3
Motorola 52nd Street Superfund Site
Phoenix, Arizona

ERM 06/12

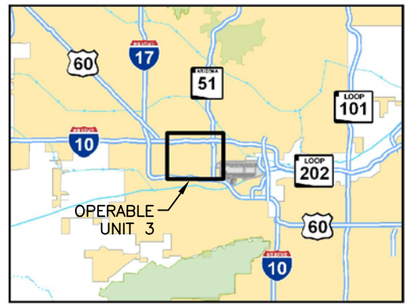
Project No. 0096498.033
Date: 06/26/12
Drawn By: R. Olson
CAD File: G:\0096498\2033\0096498033-06.dwg

McDowell Road
Roosevelt Street
Van Buren Street
Washington Street
Jefferson Street
Buckeye Road

1st Avenue
Central Avenue
7th Avenue
7th Street
16th Street
24th Street

994 996 998 1000 1002 1004 1006 1008 1010 1012 1014 1016 1018 1020

OU3-8D 992.91
Milum Textile Services
Phoenix Newspapers, Inc.
OU3-5DR 1001.93
OU3-6D 999.32
OU3-1D 1011.81
OU3-14D 1016.64
NW-12D 1021.29*
EW-22D** 1013.70*
OU3-13D** 1007.98
EW-N 995.66*
NW-4D 1007.00*
EW-M 996.20*
EW-19D 1009.44
OU3-12D 1010.14
NW-8D**1009.87*
NW-8M 1010.20*
DM-515-210 1019.61*
McCoy's Cleaners
NW-6D 1007.44*
EW-S 1009.74*
Baker Metal Products
Westinghouse
NW-16D 1010.83*
ASE-77B 1014.87*
Walker Power/ Tiernay Turbines
NW-7D 1007.31*
NW-14D 1009.92*
NW-11D 1010.69*
BC11-B NM*
EW-13-228** 1009.42
EW-13-268 1010.08
SRP
NW-13D 1009.73*
NW-9D 1011.13*
NW-19D 1013.31*
ASE-76B 1019.04*
NW-9D2** 1009.44*
NW-10D 1011.42*
ASE-88B 1015.35*
Capitol Engineering
AVB106-03
Southwest Solvents, Inc.
APS Facility
Union Pacific Railroad
Adobe/Arvin/Cooper
Wabash-Freuhauf



LEGEND

Basin Fill Sub-unit

- Monitoring Well
- OU2 Groundwater Extraction Well, Not Used for Contouring
- Well Not Monitored by the OU3 Working Group
- 1010 — Groundwater Elevation Contour (ft amsl); Contour Interval = 2 feet
- 1011.81 Groundwater Elevation (ft amsl) in OU3 Monitoring Well, March 2012
- 1014.87* Groundwater Elevation (ft amsl) in CRA Monitoring Well, March 2012
- ** Not Used for Contouring
- NM Not Measured
- ft amsl Feet Above Mean Sea Level
- Intersect of Basin Fill and Bedrock
- OU3 Boundary
- OU2 Groundwater Treatment Facility
- PRP Location

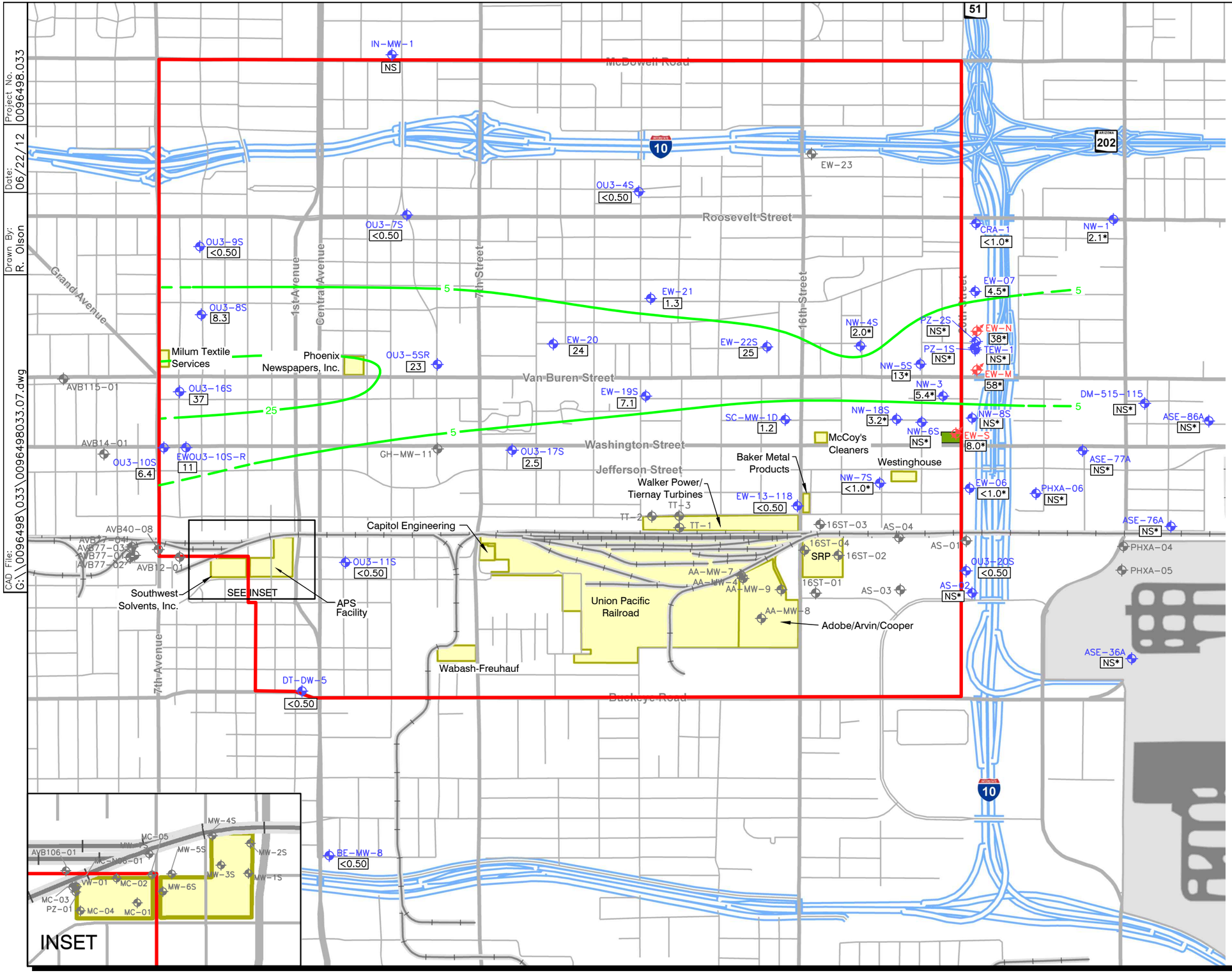
N

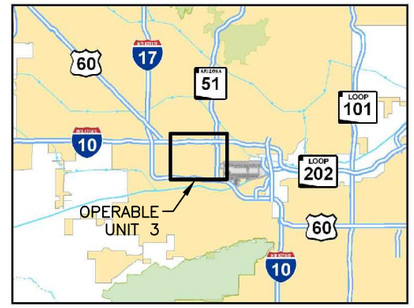
0 1600
Approx. Scale (feet)

Figure 5
Basin Fill Sub-unit
Groundwater Contour Map - March 2012
Operable Unit 3
Motorola 52nd Street Superfund Site
Phoenix, Arizona

ERM 06/12

Project No. 0096498.033
Date: 06/22/12
Drawn By: R. Olson
CAD File: G:\0096498\033\0096498033.07.dwg





LEGEND:

Salt River Gravels Sub-unit

- Upper Salt River Gravels (U-SRG) Groundwater Well
- Upper Salt River Gravels (U-SRG) Piezometer
- OU2 Groundwater Extraction Well, Not Used for Contouring
- Well Not Monitored by the OU3 Working Group
- 5 — TCE Concentration Contour; Dashed Where Inferred
- 2.6 — TCE Concentration in OU3 Groundwater Monitoring Well, March 2012
- 1.6* — TCE Concentration in CRA Monitoring Well, March 2012

Notes:
All TCE concentrations in µg/L
TCE = Trichloroethene
µg/L = micrograms per liter
<0.5 = TCE not detected above the laboratory reporting limit.
NS = Not Sampled

- OU3 Boundary
- OU2 Groundwater Treatment Facility
- PRP Location

N

0 1600
Approx. Scale (feet)

Figure 6
Upper Salt River Gravels Sub-unit
TCE Contour Map - March 2012
Operable Unit 3
Motorola 52nd Street Superfund Site
Phoenix, Arizona

ERM 06/12

Project No. 0096498.033
Date: 11/08/12
Drawn By: R.O./C.T.
CAD File: F:\0096498\033\0096498033-05.dwg

McDowell Road
Roosevelt Street
Van Buren Street
Washington Street
Jefferson Street
Buckeye Road
Grand Avenue
1st Avenue
Central Avenue
4th Street
7th Avenue
16th Street
20th Street

OU3-7M2 0.99
OU3-9M2 1.8
OU3-14M <0.50
OU3-1M 3.3
OU3-8M2 25
OU3-5MR 42
OU3-5M2 74
OU3-13M 20
OU3-16M 100
OU3-2M 26
OU3-19M 59
OU3-10M 9.8
OU3-10M2 36
OU3-12M 1.3
OU3-6M 0.69
EW-TB-16S <0.50
OU3-11M2 <0.50
OU3-11M <0.50
OU3-20M <0.50
NW-2 NS*
EW-N 38*
EW-M 58*
NW-17S 90*
NW-18M 49*
EW-S 8.0*
NW-16M NS*
NW-11M 2.9*
NW-15S NS*
NW-7M 6.2*
NW-14M 1.2*
NW-13M <1.0*
NW-9M NS*
NW-19M 1.0*

5
25
75

Milum Textile Services
Phoenix Newspapers, Inc.
McCoy's Cleaners
Baker Metal Products
Westinghouse
Walker Power/ Tierney Turbines
Capitol Engineering
Southwest Solvents, Inc.
APS Facility
SEE INSET
Union Pacific Railroad
SRP
Adobe/Arvin/Cooper
Wabash-Freuhauf

INSET
AVB106-02
MW-4M
MW-2M2
MW-2M
MW-5M
MW-5M2
MW-3M
MW-3M2
MC-N06-03
MC-N06-02
MW-6M
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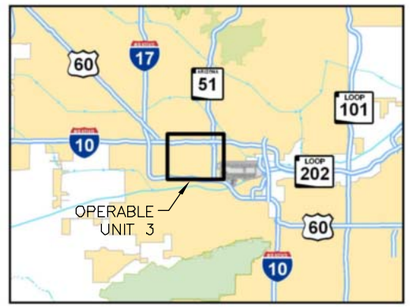
MW-1M



LEGEND

Lower Salt River Gravels Sub-unit

- Lower Salt River Gravels (L-SRG) Groundwater Well
- Calluvium Zone Monitoring Well
- OU2 Groundwater Extraction Well; Not Used for Contouring
- Well Not Monitored by the OU3 Working Group
- 5 — TCE Concentration Contour; Dashed Where Inferred
- [110] TCE Concentration in OU3 Groundwater Monitoring Well, March 2012
- [1.9*] TCE Concentration in CRA Monitoring Well, March 2012

Notes:
All TCE concentrations in µg/L
TCE = Trichloroethene
µg/L = micrograms per liter
<0.5 = TCE not detected above the laboratory reporting limit
NS = Not Sampled

- OU3 Boundary
- OU2 Groundwater Treatment Facility
- PRP Location

N
0 1600
Approx. Scale (feet)

Figure 7
Lower Salt River Gravels Sub-unit
TCE Contour Map - March 2012
Operable Unit 3
Motorola 52nd Street Superfund Site
Phoenix, Arizona
ERM 11/12

Project No. 0096498.033
Date: 11/08/12
Drawn By: R.O./C.T.
CAD File: F:\0096498\033\0096498033-06.dwg

McDowell Road
Roosevelt Street
Van Buren Street
Washington Street
Jefferson Street
Buckeye Road

1st Avenue
Central Avenue
4th Street
16th Street
24th Street
7th Avenue

OU3-8D <0.50
OU3-1D <0.50
OU3-14D <0.50
OU3-5DR <0.50
OU3-13D <0.50
EW-22D NS*
NW-4D <1.0*
NW-12D NS*
EW-N 38*
EW-M 58*
NW-6D NS*
NW-8M** NS*
NW-8D NS*
EW-S 8.0*
DM-515-21D NS*
EW-19D <0.50
OU3-12D <0.50
OU3-6D <0.50
NW-7D 7.1*
NW-16D NS*
NW-11D 12*
NW-14D 5.8*
ASE-77B NS*
ASE-76B NS*
BC11-B NS*
NW-19D 29*
NW-13D 3.3*
NW-9D2 4.5*
NW-9D 3.5*
NW-10D NS*
ASE-88B NS*
EW-13-228 2.5
EW-13-268 <0.50
AXB106-03

Milum Textile Services
Phoenix Newspapers, Inc.
McCoy's Cleaners
Baker Metal Products
Walker Power/ Tierney Turbines
Westinghouse
Capitol Engineering
Southwest Solvents, Inc.
APS Facility
SRP
Union Pacific Railroad
Adobe/Arvin/Cooper
Wabash-Freuhauf

OPERABLE UNIT 3

LEGEND

Basin Fill Sub-unit

- Monitoring Well
- DU2 Groundwater Extraction Well; Not Used for Contouring
- Well Not Monitored by the OU3 Working Group
- 5 — TCE Concentration Contour; Dashed Where Inferred
- <0.50 — TCE Concentration in OU3 Groundwater Monitoring Well, March 2012
- 2.1* — TCE Concentration in CRA Monitoring Well, March 2012
- Intersection of Basin Fill and Bedrock

Notes:
All TCE concentrations in µg/L
TCE = Trichloroethene
µg/L = micrograms per liter
<0.5 = TCE not detected above the laboratory reporting limit
NS = Not Sampled

- OU3 Boundary
- OU2 Groundwater Treatment Facility
- PRP Location

N

0 1600
Approx. Scale (feet)

Figure 8
Basin Fill Sub-unit
TCE Contour Map - March 2012
Operable Unit 3
Motorola 52nd Street Superfund Site
Phoenix, Arizona

ERM 11/12

Tables

Table 2

Monitoring Well Construction Details
Operable Unit 3
Motorola 52nd Street Superfund Site
Phoenix, Arizona

Well ID	Hydrostratigraphic Zone[1]	Latitude	Longitude	Top of Casing Elevation	Top of Screened Interval	Bottom of Screened Interval	Total Depth	Casing Diameter
Units				ft amsl	ft bgs	ft bgs	ft bgs	(inches)
BE-MW-8	U-SRG	33.4300	-112.0700	1076.35	75	105	105	4
DT-DW-5	U-SRG	33.4370	-112.0747	1077.90	59	99	99	2
EWOU3-10S-R	U-SRG	33.4480	-112.0809	1081.62	60	100	102	4
EW-13-118	U-SRG	33.4454	-112.0478	1092.71	114.5	119.5	309	4
EW-13-168	L-SRG	33.4454	-112.0478	1092.71	164.5	169.5	309	4
EW-13-228	BF	33.4454	-112.0478	1092.71	224.5	229.5	309	4
EW-13-268	BF	33.4454	-112.0478	1092.71	264.5	269.5	309	4
EW-19S	U-SRG	33.4504	-112.0561	1087.32	57	107	112	4
EW-19D	BF	33.4504	-112.0561	1087.34	247	267	270	4
EW-20	U-SRG	33.4528	-112.0561	1091.38	59	109	109	4
EW-21	U-SRG	33.4548	-112.0558	1094.24	58	108	108	4
EW-22S	U-SRG	33.4526	-112.0497	1095.81	58	108	112	4
GH-MW-11	U-SRG	33.4480	-112.0673	1083.30	50	100	100.9	4
IN-MW-1	U-SRG	33.4659	-112.0698	1088.38	70	90	90	4
SC-MW-1D	U-SRG	33.4487	-112.0482	1092.39	83	123	125	4
OU3-1M	L-SRG	33.4548	-112.0571	1093.30	140	160	162	4
OU3-1D	BF	33.4548	-112.0572	1093.09	235	255	259	4
OU3-2M	L-SRG	33.4506	-112.0563	1087.97	150	170	175	4
OU3-4S	U-SRG	33.4597	-112.0565	1094.74	59.2	110	110	4
OU3-5SR	U-SRG	33.4518	-112.0674	1087.28	69.7	119.7	120	4
OU3-5MR	L-SRG	33.4518	-112.0674	1087.37	148.7	168.7	169	4
OU3-5M2	L-SRG	33.4519	-112.0674	1087.24	202.7	222.7	253	4
OU3-5DR	BF	33.4517	-112.0674	1087.35	232.7	252.7	253	4
OU3-6M	L-SRG	33.4474	-112.0675	1083.66	152	172	172.5	4
OU3-6D	BF	33.4475	-112.0675	1083.77	230	250	261	4
OU3-7S	U-SRG	33.4586	-112.069	1085.29	60	110	112	4
OU3-7M2	L-SRG	33.4587	-112.0681	1085.59	195	215	221	4
OU3-8S	U-SRG	33.4541	-112.0802	1080.05	59.9	110.5	110.5	4
OU3-8M2	L-SRG	33.4540	-112.0802	1080.39	205.5	225.6	228	4
OU3-8D	BF	33.4540	-112.0802	1080.00	260.5	270	273	4
OU3-9S	U-SRG	33.4572	-112.0802	1080.55	59.6	110.2	110.5	4
OU3-9M2	L-SRG	33.4571	-112.0802	1080.74	219.7	229.7	235	4
OU3-10M	L-SRG	33.4480	-112.0817	1082.25	146.7	166.7	170	4
OU3-10M2	L-SRG	33.4480	-112.0817	1082.29	199.2	219.2	225	4
OU3-10S	U-SRG	33.4482	-112.0818	1081.90	125.2	75	125	4
OU3-11S	U-SRG	33.4428	-112.0723	1078.26	69.7	119.7	123	4
OU3-11M	L-SRG	33.4429	-112.0723	1078.25	153.7	173.7	178	4
OU3-11M2	L-SRG	33.4429	-112.0723	1078.05	196.7	216.7	230	4
OU3-12M	L-SRG	33.4485	-112.0498	1090.79	146.7	166.7	170	4
OU3-12D	BF	33.4487	-112.0498	1090.77	245.6	265.6	396	4
OU3-13M	L-SRG	33.4526	-112.0500	1095.75	154.7	174.7	175	4
OU3-13D	BF	33.4526	-112.0500	1095.71	224.7	244.7	250	4
OU3-14M	L-SRG	33.4566	-112.0479	1099.05	145.7	165.7	168	4
OU3-14D	BF	33.4566	-112.0478	1099.14	231.2	251.2	251.5	4
OU3-16S	U-SRG	33.4507	-112.0814	1082.19	125.2	75	125	4
OU3-16M	L-SRG	33.4506	-112.0814	1082.25	180.5	160	180	4
OU3-17S	U-SRG	33.4479	-112.0637	1082.22	120.2	70	120	4
OU3-19M	L-SRG	33.4507	-112.0498	1091.21	170.2	150	170	4
OU3-20S	U-SRG	33.4432	-112.0385	1100.20	115.2	65	115	4
OU3-20M	L-SRG	33.4432	-112.0385	1100.12	180.2	160	180	4

Notes:

amsl = above mean sea level
bgs = below ground surface
ft = feet
U-SRG = Upper Salt River Gravels Sub-unit
L-SRG = Lower Salt River Gravels Sub-unit
BF = Basin Fill Sub-unit

Well data information taken from the March 2009 Groundwater Monitoring Report - Operable Unit 3 by Shaw Environmental, Inc. (Shaw 2010).
Hydrostratigraphic zones are from the Sitewide Lithology Table revised 6 June 2011.
[1]Although wells OU3-5M2, OU3-9M2, and OU3-11M2 are screened across portions of L-SRG and BF, they are classified as L-SRG wells for mapping purposes.

Table 3

March 2012 Groundwater Sampling Event
Groundwater Elevations Summary
Operable Unit 3
Motorola 52nd Street Superfund Site
Phoenix, Arizona

Well ID	Hydrostratigraphic Zone[1]	Gauging Date	Top of Casing Elevation	Screened Interval	Depth-to-Water	Groundwater Elevation	Groundwater Elevation Change
Units			ft amsl	ft bgs	ft btoc	ft amsl	(From September 2011)
BE-MW-8	U-SRG	3/12/2012	1,076.35	75-105	82.97	993.38	2.51
DT-DW-5	U-SRG	3/12/2012	1,077.90	59-99	85.86	992.04	3.42
EW-13-118	U-SRG	3/12/2012	1,092.71	114.5-119.5	85.50	1,007.21	0.02
EW-13-168	L-SRG	3/12/2012	1,092.71	164.5-169.5	85.51	1,007.20	0.00
EW-13-228	BF	3/12/2012	1,092.71	224.5-229.5	83.29	1,009.42	0.35
EW-13-268	BF	3/12/2012	1,092.71	264.5-269.5	82.63	1,010.08	0.46
EW-19S	U-SRG	3/13/2012	1,087.32	57-107	85.73	1,001.59	0.14
EW-19D	BF	3/13/2012	1,087.34	247-267	77.90	1,009.44	1.73
EW-20	U-SRG	3/13/2012	1,091.38	59-109	92.15	999.23	0.32
EW-21	U-SRG	3/13/2012	1,094.24	58-108	91.25	1,002.99	0.15
EW-22S*	U-SRG	3/12/2012	1,095.81	58-108	90.54	1,005.27	0.00
EWOU3-10S-R	U-SRG	3/13/2012	1,081.62	60-100	94.88	986.74	3.94
IN-MW-1	U-SRG	3/13/2012	1,088.38	70-90	89.24	999.14	-0.67
OU3-1M	L-SRG	3/13/2012	1,093.30	140-160	91.14	1,002.16	-0.11
OU3-1D	BF	3/13/2012	1,093.09	235-255	81.28	1,011.81	2.04
OU3-2M	L-SRG	3/13/2012	1,094.74	59.2-110	85.95	1,008.79	0.13
OU3-4S	U-SRG	3/13/2012	1,094.74	59.2-110	91.03	1,003.71	-0.51
OU3-5SR	U-SRG	3/12/2012	1,087.28	69.7-119.7	90.45	996.83	1.05
OU3-5MR	L-SRG	3/12/2012	1,087.37	148.7-168.7	90.63	996.74	1.02
OU3-5M2	L-SRG	3/12/2012	1,087.24	202.7-222.7	90.52	996.72	1.08
OU3-5DR	BF	3/12/2012	1,087.35	232.7-252.7	85.42	1,001.93	2.07
OU3-6M	L-SRG	3/13/2012	1,083.66	152-172	87.78	995.88	1.57
OU3-6D	BF	3/13/2012	1,083.77	230-250	84.45	999.32	2.12
OU3-7S	U-SRG	3/13/2012	1,085.29	60-110	87.52	997.77	0.10
OU3-7M2	L-SRG	3/13/2012	1,085.59	195-215	87.55	998.04	0.15
OU3-8S	U-SRG	3/13/2012	1,080.05	59.9-110.5	90.62	989.43	2.51
OU3-8M2	L-SRG	3/13/2012	1,080.39	205.5-225.6	90.40	989.99	2.50
OU3-8D	BF	3/13/2012	1,080.00	260.5-270	87.09	992.91	3.71
OU3-9S	U-SRG	3/13/2012	1,080.55	59.6-110.2	90.23	990.32	1.74
OU3-9M2	L-SRG	3/13/2012	1,080.74	219.7-229.7	90.12	990.62	-0.21
OU3-10S	U-SRG	3/13/2012	1,081.90	75-125	94.39	987.51	4.19
OU3-10M	L-SRG	3/13/2012	1,082.25	146.7-166.7	94.77	987.48	3.93
OU3-10M2	L-SRG	3/13/2012	1,082.29	199.2-219.2	94.62	987.67	4.27
OU3-11S	U-SRG	3/13/2012	1,078.26	69.7-119.7	85.54	992.72	2.92
OU3-11M	L-SRG	3/13/2012	1,078.25	153.7-173.7	85.65	992.60	2.89
OU3-11M2	L-SRG	3/13/2012	1,078.05	196.7-216.7	85.45	992.60	2.94
OU3-12M	L-SRG	3/13/2012	1,090.79	146.7-166.7	85.52	1,005.27	-0.07
OU3-12D	BF	3/13/2012	1,090.77	245.6-265.6	80.63	1,010.14	0.91
OU3-13M	L-SRG	3/12/2012	1,095.75	154.7-174.7	90.48	1,005.27	-0.14
OU3-13D	BF	3/12/2012	1,095.71	224.7-244.7	87.73	1,007.98	0.37
OU3-14M	L-SRG	3/13/2012	1,099.05	145.7-165.7	91.83	1,007.22	-0.53
OU3-14D	BF	3/13/2012	1,099.14	231.2-251.2	82.50	1,016.64	0.68
OU3-16S	U-SRG	3/13/2012	1,082.19	75-125	94.04	988.15	3.56
OU3-16M	L-SRG	3/13/2012	1,082.25	160-180	94.26	987.99	3.50
OU3-17S	U-SRG	3/13/2012	1,082.22	70-120	83.73	998.49	0.87
OU3-19M	L-SRG	3/13/2012	1,091.21	150-170	85.86	1,005.35	-0.15
OU3-20S	U-SRG	3/13/2012	1,100.20	65-115	88.68	1,011.52	-0.44
OU3-20M	L-SRG	3/13/2012	1,100.12	160-180	88.81	1,011.31	-0.46
SC-MW-1D	U-SRG	3/13/2012	1,092.39	83-123	86.46	1,005.93	-0.11
						Average =	1.32

Notes:

amsl = above mean sea level
btoc = below top of casing
bgs = below ground surface
ft = feet
U-SRG = Upper Salt River Gravels Sub-unit
L-SRG = Lower Salt River Gravels Sub-unit
BF = Basin Fill Sub-unit

Well information taken from the March 2009 Groundwater Monitoring Report - Operable Unit 3 by Shaw Environmental, Inc. (Shaw 2010).
Hydrostratigraphic zones are from the Sitewide Lithology Table revised 6 June 2011.

[1]Although wells OU3-5M2, OU3-9M2, and OU3-11M2 are screened across portions of L-SRG and BF, they are classified as L-SRG wells for mapping purposes.

*EW-22S was sampled by ERM since OU2 was not sampling this well during the March 2012 semi-annual event.

Table 6

March 2012 Groundwater Sampling Event
Analytical Data Summary
Operable Unit 3
Motorola 52nd Street Superfund Site
Phoenix, Arizona

Well ID	Hydrostratigraphic Zone[1]	Sample Date	Screened Interval	TCE	PCE	cis-1,2-DCE	1,1-DCA	1,1-DCE	1,4-Dioxane
Units			ft btoc	µ/L	µ/L	µ/L	µ/L	µ/L	µ/L
AWQS				**5**	**5**	**70**	NA	**7**	NA
BE-MW-8	U-SRG	3/26/2012	75-105	< 0.50	**6.2**	< 0.50	< 0.50	< 0.50	< 1.0
DT-DW-5	U-SRG	3/12/2012	59-99	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	1.0
EW-13-118	U-SRG	3/12/2012	114.5-119.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 1.0
EW-13-168	L-SRG	3/12/2012	164.5-169.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 1.0
EW-13-228	BF	3/12/2012	224.5-229.5	2.5	< 0.50	< 0.50	< 0.50	< 0.50	< 1.0
EW-13-268	BF	3/12/2012	264.5-269.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 1.2
EW-19S	U-SRG	3/22/2012	57-107	**7.1**	< 0.50	1.8	1.6	1.3	1.5
EW-19D	BF	3/22/2012	247-267	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 1.0
EW-20	U-SRG	3/21/2012	59-109	**24**	1.0	4.3	2.9	3.4	1.2
EW-21	U-SRG	3/27/2012	58-108	1.3	< 0.50	< 0.50	< 0.50	< 0.50	< 1.0
EW-22S	U-SRG	3/23/2012	58-108	**25**	1.2	3.9	2.0	1.2	< 1.0
EW-22S-Q1	U-SRG	3/23/2012	58-108	**23**	0.99	3.7	1.9	1.9	< 1.0
EWOU3-10S-R	U-SRG	3/20/2012	60-100	**11**	0.62	1.9	1.8	< 0.50	1.1
OU3-1M	L-SRG	3/27/2012	140-160	3.3	< 0.50	< 0.50	< 0.50	< 0.50	< 1.0
OU3-1D	BF	3/27/2012	235-255	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 1.0
OU3-2M	L-SRG	4/10/2012	150-170	**26**	1.1	6.0	3.8	6.4	1.6
OU3-4S	U-SRG	3/15/2012	59.2-110	< 0.50	2.9	< 0.50	< 0.50	< 0.50	< 1.0
OU3-5SR	U-SRG	3/21/2012	69.7-119.3	**23**	1.2	4.9	3.3	3.8	1.4
OU3-5MR	L-SRG	3/21/2012	148.7-168.7	**42**	1.9	8.2	4.7	6.2	2.0
OU3-5M2	L-SRG	3/21/2012	202.7-222.7	**74**	2.8	13	5.9	**8.5**	2.5
OU3-5DR	BF	3/21/2012	232.7-252.7	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 1.0
OU3-6M	L-SRG	3/16/2012	152-172	0.69	< 0.50	< 0.50	< 0.50	< 0.50	< 1.0
OU3-6D	BF	3/16/2012	230-250	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 1.0
OU3-7S	U-SRG	3/15/2012	60-110	< 0.50	2.9	< 0.50	< 0.50	< 0.50	< 1.0
OU3-7M2	L-SRG	3/15/2012	195-215	0.92	1.0	< 0.50	< 0.50	< 0.50	< 1.0
OU3-7M2-Q1	L-SRG	3/15/2012	195-215	0.99	1.2	< 0.50	< 0.50	< 0.50	< 1.0
OU3-8S	U-SRG	3/19/2012	59.9-110.5	**8.3**	0.87	1.0	< 0.50	< 0.50	< 1.0
OU3-8M2	L-SRG	3/19/2012	205.5-225.6	**25**	1.0	2.5	< 0.50	< 0.50	< 1.0
OU3-8D	BF	3/19/2012	260.5-270	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 1.0
OU3-9S	U-SRG	3/19/2012	59.2-110.2	< 0.50	2.1	< 0.50	< 0.50	< 0.50	< 1.0
OU3-9M2	L-SRG	3/19/2012	219.7-229.7	1.8	2.5	< 0.50	< 0.50	< 0.50	< 1.0
OU3-10S	U-SRG	3/20/2012	75-125	**6.4**	0.54	1.2	1.3	1.4	1.0
OU3-10M	L-SRG	3/20/2012	146.7-166.7	**9.8**	0.75	1.9	1.8	2.1	1.3
OU3-10M2	L-SRG	3/20/2012	199.2-219.2	**36**	1.5	7.0	6.1	**9.7**	3.3
OU3-10M2-Q1	L-SRG	3/20/2012	199.2-219.2	**36**	1.5	7.5	5.7	**9.6**	3.1
OU3-11S	U-SRG	3/26/2012	69.7-119.7	< 0.50	0.79	< 0.50	< 0.50	< 0.50	< 1.0
OU3-11M	L-SRG	3/26/2012	153.7-173.7	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 1.0
OU3-11M2	L-SRG	3/26/2012	196.7-216.7	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 1.0
OU3-12M	L-SRG	3/16/2012	146.7-166.7	1.3	< 0.50	< 0.50	< 0.50	0.76	< 1.0
OU3-12D	BF	3/16/2012	245.6-265.6	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 1.0
OU3-13M	L-SRG	3/23/2012	154.7-174.7	**20**	0.56	1.7	< 0.50	< 0.50	< 1.0
OU3-13D	BF	3/23/2012	224.7-244.7	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 1.0
OU3-14M	L-SRG	3/15/2012	145.7-165.7	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 1.0
OU3-14D	BF	3/15/2012	231.2-251.2	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 1.0
OU3-16S	U-SRG	3/20/2012	75-125	**37**	1.8	6.9	4.2	4.1	1.9
OU3-16M	L-SRG	3/20/2012	160-180	**100**	4.0	18	7.5	**12**	3.0
OU3-16M-Q1	L-SRG	3/20/2012	160-180	**99**	4.0	18	7.5	**12**	2.7
OU3-17S	U-SRG	3/23/2012	70-120	2.5	< 0.50	< 0.50	< 0.50	< 0.50	< 1.0
OU3-19M	L-SRG	3/23/2012	150-170	**59**	2.4	11	7.4	**7.5**	2.5
OU3-20S	U-SRG	4/10/2012	65-115	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 1.0
OU3-20M	L-SRG	3/22/2012	160-180	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 1.0
SC-MW-1D	U-SRG	3/16/2012	83-123	1.2	< 0.50	< 0.50	0.55	0.64	< 1.0

Notes:

1,1-DCA = 1,1-Dichlororethane
1,1-DCE = 1,1-Dichloroethene
cis-1,2-DCE = cis-1,2-Dichloroethene
PCE = Tetrachloroethene
TCE = Trichloroethene
AWQS = Arizona Water Quality Standards
BOLD = greater than or equal to the AWQS
µg/L = micrograms per liter
ft = feet btoc = below top of casing

NA = not applicable or no standard
< = concentration is less than indicated detectable value
BF = Basin Fill Sub-unit
U-SRG = Upper Salt River Gravels Sub-unit
L-SRG = Lower Salt River Gravels Sub-unit
Q1 = sample is field duplicate
Well information taken from the March 2009 Groundwater Monitoring Report - Operable Unit 3 by Shaw Environmental, Inc. (Shaw 2010).
Hydrostratigraphic zones are from the Sitewide Lithology Table revised 6 June 2011.
[1]Although wells OU3-5M2, OU3-9M2, and OU3-11M2 are screened across portions of L-SRG and BF, they are classified as L-SRG wells for mapping purposes.

Table 7

March 2012 Groundwater Sampling Event
Non-OU3 Program Monitoring Well Construction Details,
Groundwater Depths, and TCE Concentrations
Operable Unit 3
Motorola 52nd Street Superfund Site
Phoenix, Arizona

Well ID	Hydrostratigraphic Zone[1]	Top of Casing Elevation	Top of Screened Interval	Bottom of Screened Interval	Total Depth	Groundwater Elevation	TCE
Units		ft amsl	ft bgs	ft bgs	ft bgs	ft amsl	µg/L
AWQS							**5**
AS-02	U-SRG	1099.67	50	90	--	1011.80	--
ASE-28A	U-SRG	1108.28	--	--	--	Dry	--
ASE-36A	U-SRG	1102.58	69	99	--	1017.65	--
ASE-76A	U-SRG	1105.42	80	130	130	1019.31	--
ASE-76B	BF	1105.34	180	230	265	1019.04	--
ASE-77A	U-SRG	1101.86	85	115	115	1015.65	--
ASE-77B	BF	1101.76	180	230	258	1014.87	--
ASE-86A	U-SRG	1106.07	86	126	--	1022.15	--
ASE-88B	BF	1103.08	175	215	230	1015.35	--
BC11-B	BF	1111.25	135	160	--	NG	--
BC-16	U-SRG	1116.02	70	85	86	1049.69	--
CRA-1	U-SRG	1106.48	105.5	125.5	270	1015.01	< 1.0
DM-515-115	U-SRG	1103.61	115	--	--	NG	--
DM-515-210	BF	1103.61	210	--	--	1019.61	--
EW-06	U-SRG	1097.57	61	111	112	1011.02	< 1.0
EW-07	U-SRG	1104.99	78	128	129	1011.16	4.5
EW-22D	BF	1095.81	407	427	430	1013.70	--
EW-SPZ1	SRG* / BF	1098.26	118	208	--	1010.41	--
EW-M	SRG* / BF	1103.61	86	206	233	996.20	**58**
EW-N	SRG* / BF	1110.78	100	220	240	995.66	**38**
EW-S	SRG* / BF / BR	1100.37	94	194	215	1009.74	**8.0**
NW-1	U-SRG	1112.22	90	110	211	1028.06	2.1
NW-2	L-SRG	1101.87	173	193	212	1008.23	--
NW-3	U-SRG	1097.16	120	140	158	1008.53	**5.4**
NW-4D	BF	1099.92	182.5	202.5	221	1007.00	< 1.0
NW-4S	U-SRG	1099.96	90	130	221	1007.88	2.0
NW-5S	U-SRG	1099.98	88	128	147	1008.01	**13**
NW-6D	BF	1096.92	181.5	201.5	217.5	1007.44	--
NW-6S	U-SRG	1096.82	89.5	129.5	130	1008.41	--
NW-7D	BF	1094.21	215	235	298	1007.31	**7.1**
NW-7M	L-SRG	1093.94	180	200	--	1008.38	**6.2**
NW-7S	U-SRG	1094.19	89.5	129.5	130	1008.50	< 1.0
NW-8D	BF	1098.72	224	244	248	1009.87	--
NW-8M	BF	1098.65	175	195	195	1010.20	--
NW-8S	U-SRG	1098.45	99	149	151	1010.08	--
NW-9D	BF	1099.58	210	230	230	1011.13	3.5
NW-9D2	BF	1099.58	240	260	270	1009.44	4.5
NW-9M	L-SRG	1099.42	170	190	--	1010.81	--
NW-10D	BF	1098.91	210	230	300	1011.42	--
NW-11D	BF	1097.69	210	230	287	1010.69	**12**
NW-11M	L-SRG	1097.59	173	193	193	1010.94	2.9/2.7
NW-12D	BF	1104.10	225	245	300	1021.29	--
NW-13D	BF	1096.11	215	235	--	1009.73	3.3
NW-13M	L-SRG	1095.75	175	195	--	1009.63	< 1.0
NW-14D	BF	1099.62	215	235	--	1009.92	**5.8**
NW-14M	L-SRG	1099.05	175	195	--	1009.83	1.2
NW-15S	L-SRG	1099.02	--	--	--	1013.26	--
NW-16M	L-SRG	1097.92	155	175	--	1010.35	--
NW-16D	BF	1097.96	220	230	--	1010.83	--
NW-17S	CV	1096.75	130	145	--	1008.46	**90**
NW-18S	U-SRG	1094.78	90	130	--	1008.33	3.2/2.9
NW-18M	CV	1094.92	170	190	--	1008.35	**49**
NW-19M	L-SRG	1100.69	165	185	--	1013.49	1.0
NW-19D	BF	1100.50	205	220	--	1013.31	**29/30**
PHXA-06	U-SRG	1100.84	50	140	205	1014.37	--
PZ-1S	U-SRG	1102.41	99	119	258	1007.54	--
PZ-1D	BR	1102.69	217	237	--	1007.59	--
PZ-2S	U-SRG	1107.92	125	145	269	1007.53	--
PZ-2D	BR	1107.95	245	265	--	1007.55	--
TEW-1	U-SRG	1103.47	100	145	160	1007.50	--

Notes:

-- = no data
U-SRG = Upper Salt River Gravels Sub-unit
L-SRG = Lower Salt River Gravels Sub-unit
BF = Basin Fill Sub-unit
BR = Bedrock
CV = Colluvium
SRG* = Screened in U-SRG and L-SRG
bgs = below ground surface
µg/L = micrograms per liter
ft = feet
NG = not gauged
TCE = Trichloroethene
amsl = above mean sea level
BOLD = greater than or equal to the AWQS
AWQS = Arizona Water Quality Standards
[1]Unless otherwise noted with asterisk, revised stratigraphic zones are from Sitewide Lithology Table revised 6 June 2011.
Well construction, TCE, GW elevation data and data validation flags from *Data Transmittals received from CRA on 5/10/12 and 6/12/12* (CRA 2012) and CH2MHILL (2012)
Non-OU3 SRG is not typically broken into U-SRG and L-SRG divisions. Table 7 makes this distinction to facilitate the incorporation of non-OU3 data into Figures 3, 4, 6, and 7, which do distinguish between an Upper and Lower Salt River Gravels Sub-unit.